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real-time processing the variables detected by the control unit in order to assess the actual conditions of the thermal engine operation;

regulating a system voltage according to the engine conditions of operation using a voltage regulator connected in turn to an alternator of the thermal engine and without using a phase signal from the alternator.

#### REMARKS

Claims 1-8 and 11-13 are presented for further examination. Claims 1, 4, 6, and 11 have been amended. Claims 9 and 10 have been cancelled.

In the Office Action, the Examiner objected to the drawings because the sensors of claim 5 were not shown. Applicants are submitting herewith proposed revisions to Figure 5 showing the sensors (16) in connection with the engine (15) and the control unit (14). Applicants respectfully request that the proposed drawing changes be approved and entered in the application.

Claims 1-13 were rejected under 35 U.S.C. § 112, first paragraph. Remarks accompanying this rejection state that the disclosure claims the control unit is able to "process, supply and predict later changes," however no steps or structural information is given as to how the control unit is able to perform the claimed tasks. The remarks further request description regarding the switching off of the voltage regulator and the minimum value claimed therein. Applicants have cancelled the claims directed to the switching off of the voltage regulator and have cancelled from the claims the subject matter related to the prediction of later changes.

Claims 1-13 were also rejected under 35 U.S.C. § 112, second paragraph, inasmuch as claim 1 disclosed the control unit within a "regulating loop" that was not adequately described, and that the terms "fast rate" and "real time" in claim 6 were indefinite. Applicants have cancelled the indefinite subject matter from claims 1 and 6.

Turning to the merits, claims 1-4, 7, 11, and 12 were rejected under 35 U.S.C. § 102(e) as anticipated by U.S. Patent No. 6,014,016 ("Maruyama et al."). Claims 5, 6, 8, and 13 were rejected under 35 U.S.C. § 103(a) as obvious over Maruyama et al. in view of U.S. Patent No. 6,344,734 ("Iwatani et al."). Claims 9 and 10 were rejected under 35 U.S.C. § 103(a) as

obvious over Maruyama et al. in view of Iwatani et al. and further in view of U.S. Patent No. 5,744,941 ("Bartol et al.").

Applicants respectfully disagree with the bases for the rejections and request reconsideration and further examination of the claims.

The present invention relates to the voltage regulation of an automobile alternator wherein the conventional method of using the alternator phase signal is discarded and a new phase signal is generated by the engine control unit in response to changes in engine variables such as engine torque, engine rpm, and engine temperature. This provides a more responsive control signal to the alternator that is not delayed when using the alternator phase signal as the control signal. new

Maruyama et al., U.S. Patent No. 6,014,016, teaches a generator control device disposed in a generator and communicating over a signal wire to a control unit. More particularly, the control device sends a condition signal through the signal wire to the outside control unit, and a switch-on signal of the ignition switch is sent to the control device through the signal wire from the outside control unit. As shown in Figure 1, Maruyama et al. teaches the use of the alternator phase signal (P), which is as described in applicants' background as a prior art device that provides indirect control inasmuch as control is based on the alternator phase signal. In contrast, the present invention utilizes a phase signal that is generated from engine performance parameters and not from the alternator phase signal. preamble

Turning to the claims, claim 1 is directed to a loop-type voltage regulating device for regulating the voltage of an automotive electric system having at least one thermal engine, a voltage regulator, an alternator, and comprising a control unit connected between the engine and the voltage regulator and adapted to receiving a regulated voltage signal and at least one engine operation signal pertaining to one from among engine torque value, engine rpm, and engine temperature, and in response thereto to supply the voltage regulator with a signal corresponding to the engine operation for regulating the voltage delivered from the alternator. As discussed above with respect to Maruyama et al., nowhere does Maruyama et al. teach or suggest using only a regulated voltage signal and at least one engine operation signal pertaining to one from among engine torque value, engine rpm, and engine temperature or generating a signal for

regulating the voltage delivered by the alternator. Rather, Maruyama et al. teaches using the voltage phase signal (P), which is contrary to the present invention.

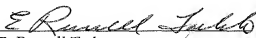
In view of the foregoing, applicants respectfully submit that claim 1, and dependent claims 2-8 are allowable. More particularly, the combination of Maruyama et al. and Iwatani et al. would fall short of the claimed invention for the reasons discussed above with respect to Maruyama et al., that is, that Maruyama et al. specifically teaches using the alternator phase signal to control the voltage.

Independent claim 11 is directed to a method of loop regulating a voltage of an automotive electric system that comprises detecting variables related to the operation of a thermal engine by having a control unit connected to the engine, the variables comprising at least one from among engine torque, engine temperature, and engine rpm; real-time processing the variables detected by the control unit in order to assess the actual conditions of the thermal engine operations; and regulating a system voltage according to the engine conditions of operation using a voltage regulator connected in turn to an alternator of the thermal engine and without using a phase signal from the alternator. Applicants respectfully submit that claim 11 and dependent claims 12 and 13 are allowable for the reasons discussed above with respect to claim 1.

In view of the foregoing, applicants respectfully submit that all of the claims remaining in this application are now in condition for allowance. In the event the Examiner finds minor informalities that can be resolved by telephone conference, the Examiner is urged to contact applicants' undersigned representative by telephone at (206) 622-4900 in order to expeditiously resolve prosecution of this application. Consequently, early and favorable action allowing these claims and passing this case to issuance is respectfully solicited.

Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached page is captioned "**Version With Markings to Show Changes Made.**"

Respectfully submitted,  
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